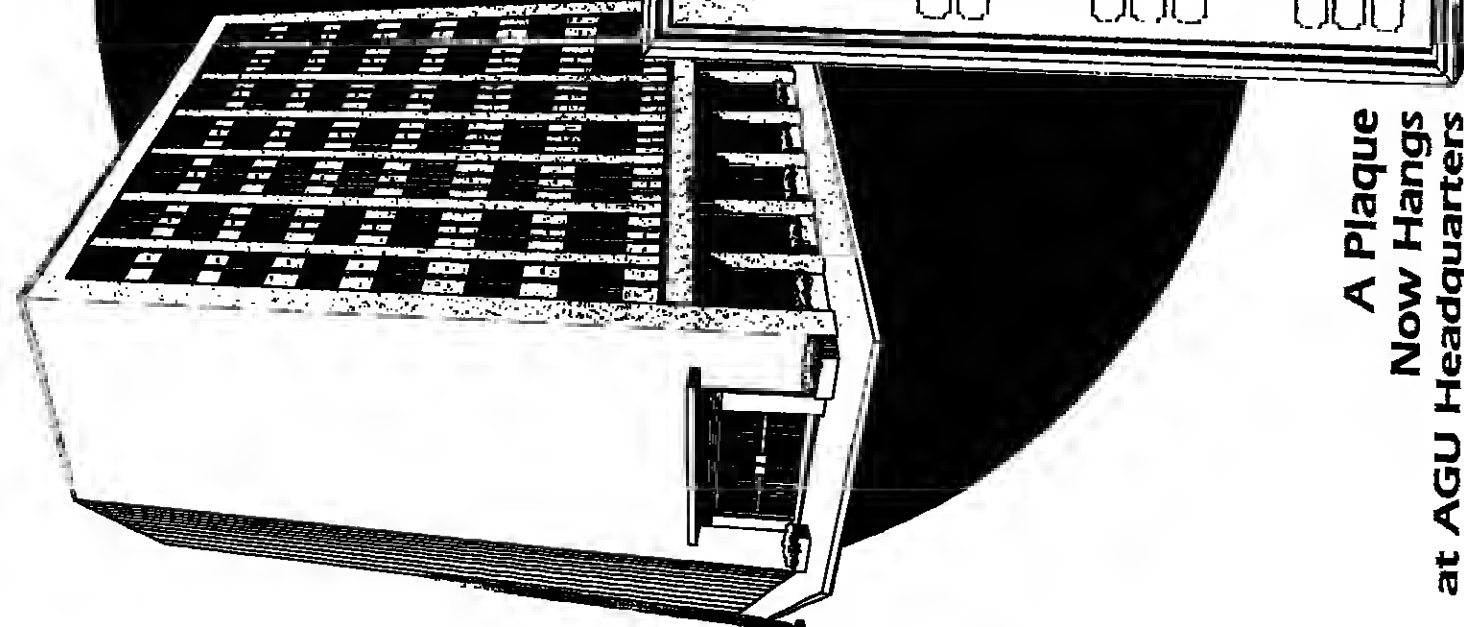


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## Planetary

6575 *Orbit of Pioneer 10*  
P. Thomas and J. Yevers (Laboratory for Planetary Studies, Cornell University, Ithaca, N.Y. 14853).  
D. Morrison, R. Durrant, and J. Yevers.  
Pioneer 10 provides information on the size, rotation rate, surface markings and photometric properties of this mysterious object. Phobos is approximately equatorial in its longest diameter, ~230 km. It is only slightly prolate with the distance between the centers of mass of 0.4 ± 0.2 hours and by resolution of the images (1.1 pixel across the disk) Phobos is found to be a single body. The geometric albedo of Phobos is 0.04 ± 0.01. The most prominent surface features are brighter patches at high northern and southern latitudes that show reflections at such angles as 50° greater than the dark, island areas. These patches are scattered and do not appear to constitute ground-based spectra that show Phobos has a flat surface. The Voyager data agree with earlier observations that show Phobos has a flat surface. Observation is not consistent with simple contamination of impact by debris from Phobos. (J. Geophys. Res., 88, 2nd, Paper 30059)

## Seismology

6003 *Body Waves*  
A METHOD FOR MODELING SEISMIC WAVES FROM 3D DATA WITH LATERAL VELOCITY CHANGES  
A. G. Gelfand and L. R. Foster (Seismological Institute of the USSR Academy of Sciences, Moscow, U.S.S.R.)  
A new method of modeling wave of fast reflection data is presented. It allows continuous changes in lateral velocity to be taken into account. Each point in the subsurface is regarded as a point scatterer and the only scatterer in the subsurface. If it were the only scatterer in the subsurface, the reflection curves are relatively simple to determine. Computing the diffraction curves by the method of lateral velocity variations, however, requires a more complex ray tracing. Our method avoids the diffraction curves by approximating the exact solution for a model in which the velocity varies only with depth. The slowness (reciprocal velocity) function is defined as the sum of the functions, the first of which is lateral and the second is depth. The lateral function is used to calculate the lateral velocity variations. For each depth, the lateral function is used to calculate the lateral velocity variations. The travel time perturbations are approximated to the first order by the lateral velocity variations. (J. Geophys. Res., 88, 2nd, Paper 30053)

## Solar Physics, Astrophysics, and Astronomy

7720 *Solar Physics, Astrophysics and Astronomy (Transmittance Analysis)*  
J. L. Linsky (University of Colorado, Boulder, CO 80502) and A. S. Shorrock

A three component model of the solar chromosphere, developed from ground based observations of the G11 chromospheric emission, is used to calculate the solar flux of the Lyman alpha line between 1940 and 1980. The Lyman alpha flux of solar activity is calculated in the model and is shown as a 2.2 x 10<sup>14</sup> photons/cm<sup>2</sup> s. This value is compared with the 1.5 x 10<sup>14</sup> photons/cm<sup>2</sup> s measured at the Lyman alpha line by the Lyman alpha line flux monitor on the Skylab 2 mission. The model also shows that the Lyman alpha flux increases to as much as 10% of the average flux for the 11 year solar cycle. The Lyman alpha flux is shown to be a good indicator of the solar cycle. The model also shows that the Lyman alpha flux is a good indicator of the solar cycle. (J. Geophys. Res., 88, 2nd, Paper 30059)

## Tectonophysics

6180 *Plate Tectonics*  
ACCENTED TECTONICS IN THE NORTHERN PART OF THE PHILIPPINE ARCHIPELAGO  
D. E. Goff (Department of Geological Sciences, Cornell University, Ithaca, New York 14853)  
The Philippine Archipelago consists of a complex array of ophiolite, continental fragments and island arcs. The Philippine Archipelago is a complex array of ophiolite, continental fragments and island arcs. The Philippine Archipelago is a complex array of ophiolite, continental fragments and island arcs. (J. Geophys. Res., 88, 2nd, Paper 30059)

## News

## Volcanic Event in Soviet Arctic?

An unusual, high-altitude plume originating at Bennett Island (Ostruv Bennett) (78°N, 149°E) in the high Soviet Arctic, reminiscent of a volcanic eruption, was discovered during a routine scan of NOAA-6 infrared imagery by the National Weather Service in Anchorage (Bruce Webster, personal communication, 1983). On the cover is an image acquired during satellite pass No. 18943 (NOAA-6) on February 18, 1983, at 00:47:56 UT. The plume originated over the northeastern corner of Bennett Island. The horizontal cross section over the source region is approximately 10 km and the observable length is 250 km. The fine structure of the plume's initial segment suggests the possibility of a multiple source. Three distinct puffs corresponding to separate explosions make up the distal part of the plume.

Earlier passes of NOAA-6 and NOAA-7 were also analyzed. One indeed revealed such multiple structure during the initial phase of the event. Figure 1 is an image taken during pass No. 8555 (NOAA-7) at 00:47:00 UT on February 18. The picture shows a double or possibly triple source. One closely spaced pair of sources is located over water (sea ice) 15 km from the eastern shore of the island. The water depth at this location is less than 100 m. No unusual high-altitude plumes were detected during earlier passes, except for a faint low level plume, ~90 km long, noticed during pass No. 8531 (NOAA-7) at 18:04:57 UT on February 17. That plume did not appear on the image taken 4 h later (NOAA-6, pass No. 18938 at 21:56:04 UT on February 17).

Passes over the region subsequent to the event shown on the cover and in Figure 1 did not show any explosive activity. However, on April 8 a new explosion was sighted during satellite pass No. 9227 (NOAA-7) at 00:56:40 UT. The explosion had apparently just begun and showed up as a circular, high-contrast cloud directly over the northeast corner of Bennett Island.

Temperature enhancements of the infrared images show that the plume-top temperatures for the February event range from ~45 to ~48°C. The 500 millibar synoptic charts for February 17 and 18 indicate that Barrow, Alaska, was directly downwind from Bennett Island. We therefore estimated the plume height by comparing the plume-top temperature with radiosonde temperatures measured at Barrow on February 17, 23:00 UT. The tropopause was at 8.5 km and the plume-top height was either at 7 km or at 13 km.

The origin time of the main explosive phase is difficult to determine because the wind velocity over Bennett Island at the time in question is not known. There is, however,

enough photo coverage to deduce that the main explosive phase must have started after 21:56 UT on February 17 and before February 18, 00:47 UT. Comparison of plume development between 04:57 and 06:15 UT on February 18 (NOAA-6, passes 18942 and 18943) gives an average plume drift of ~60 km/hr.

Seismic records from the Geophysical Institute network do not reveal any event occurring in the vicinity of Bennett Island during the time interval of interest. Our infrasound-detection array in Fairbanks was shut down and our array in Antarctica did not show any signature of an explosive event during the relevant period.

Preliminary data on aerosol routinely collected at Barrow by the Arctic Air Chemistry group of the University of Rhode Island show that elemental abundances of Al, V, Mn, Br, and Na were within their normal ranges both before, during and after February 18 (Ken Rahn, personal communication, 1983).

The location of the event, if volcanic, is most unusual. The nearest Quaternary volcano on mainland Asia is Balagan-Tai (66°45'N, 143°74'E), a cinder cone with a historic eruption about 1775. That volcano lies ~1300 km SSW of Bennett Island in Siberia. Searching for other possible historic eruptions in the Arctic, we found one reference to an apparent submarine volcanic eruption from a seamount on the flank of the Lomonosov Ridge at 83°27'N, 65°58'W, 1600 km N of Bennett Island (Hunkle, 1962). Seagulls, bursting ice, explosive noises, and strong H<sub>2</sub>S odors were reported in the area November 21-24, 1957, by a USSR scientific field party on a drifting ice station. Bennett Island lies on the Siberian continental shelf, ~200 km east of the projected intersection of the Lomonosov Ridge with the shelf edge. The Arctic ocean spreading center (Nansen-Gakkel Ridge) intersects the shelf 500 km W of Bennett Island.

A review of Soviet geologic literature (M. Churkin, pers. comm.) indicates that olivine-bearing basalts, perhaps from the Cretaceous period, crop out over much of Bennett Island. Fossiliferous Cambrian and Ordovician argillites, siltstone, and minor sandstone and limestone underlie the basalts. According to a Dr. Anblar, a member of DeLong's shipwrecked party that discovered Bennett Island on July 11, 1881, the weathered "trap-rock" (basalt) forms prominent bluffs; some of the bluffs show well-developed columnar jointing (DeLong, 1883). The basalts and also the underlying sedimentary basement are flat-lying and undeformed, indicating little tectonic activity since Paleozoic time.

In spite of the unusual location, it is possible that the recent explosion on Bennett Island could be of natural origin and may have been associated with the formation of a new

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IMS Source Book: Guide to the International Magnetospheric Study Data Analysis (1982), C.T. Russell and D.J. Southwood, editors, \$82.

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volcanic vent. Activity may be continuing, as indicated by the most recent explosion seen on April 8. One would hope that further collaborative evidence will be forthcoming from Soviet colleagues to determine whether there is volcanic activity on Bennett Island. If this is indeed the case, it would have significant implications in the study of the tectonics of the Arctic.

The estimated power released during the February 18 event would be ~10<sup>12</sup> Watts based on the plume altitude of 7 km (Morton et al., 1956). It is unlikely that a time-limited thermal fuel burn could release that much power.

## Acknowledgment

This work was supported by research funds appropriated by the State of Alaska to the Geophysical Institute.

## References

Hunkle, G., Übersicht über die vulkanische Tätigkeit 1957-1959, *Bull. Volc.*, 24, 342-343, 1962.  
DeLong, Emma (Ed.), *The voyage of the Jeannette: The ship and ice journals of George W. DeLong, Lieutenant-Commander U.S.N., and Commander of the Polar expedition of 1879-1881*, vol. 2, chapter 14, The Riverside Press, Cambridge, Mass., 648-691, 1883.  
Morton, B. R., G. Taylor, and J. S. Turner, Turbulent gravitational convection from maintained and instantaneous sources, *Proc. Roy. Soc., Ser. A*, 234, 1-23, 1956.

This news item was contributed by J. Kientle, J. G. Roederer, and G. E. Shaw of the Geophysical Institute, University of Alaska, Fairbanks, AK 99701.

Antarctic  
Atmosphere

The January 1983 issue of the *Bulletin of the Scientific Committee on Antarctic Research (SCAR)* contains information on the activities of the Working Group on Upper Atmosphere Physics that are of interest to U.S. scientists. This working group met during the 17th Meeting of SCAR held in Leningrad in July 1982. The working group noted that the southern polar region is uniquely significant in relation to the structure and dynamics of the middle atmosphere and therefore SCAR endorsed the coordinated, international Middle Atmosphere Program (MAP) in Antarctica.

With regard to Antarctic data obtained during the International Magnetospheric Study (IMS), SCAR urged scientists to initiate international, bilateral, collaborative programs to extract important new results relevant to the IMS. The Secretary of the IAGA Interdivisional Commission on Antarctic Research (T. Hirasawa, National Institute for Polar Research, Tokyo) has available tabular information on IMS Antarctic data and programs. Similar information is contained on the 1982 *IMS Source Book*, published by AGU.

In terms of future research priorities, the working group identified the following areas:

(1) Research scientists should exploit to the full the uniqueness of Antarctica for the study of the aeronomy, dynamics, and energetics of the entire atmosphere in response to the precipitation of charged particles from space, and associated phenomena, occurring at subauroral and auroral latitudes, in the troposphere and in the polar cap.

(2) Multistation, ground-based programs should be pursued to provide spatially resolved information.

(3) Existing networks of ground stations should be strengthened by internationally planned chains of unmanned observatories.

(4) Balloon programs should be conducted to provide longitudinal scans at constant latitude.

(5) Rocket programs should be continued in order to give vertical profiles of atmospheric physical parameters.

The working group proposed that a 4-day Workshop on Energetics and Dynamics of the Upper Atmosphere at Southern High Latitudes (WEDUASHL) be held during the 1984 SCAR meeting (location to be determined). The working group also re-appointed Nagata as chairman and M. J. Rycroft (British Antarctic Survey, Cambridge) as cochairman.

This news item was contributed by Louis J. Lanzerotti, Bell Laboratories, Murray Hill, NJ 07971.

Satellite Sale  
Update

A senior Department of Commerce official whose connections with the Communications Satellite Corp. (Comsat) regarding the proposed sale of the weather and land satellites (Eos, March 22, 1983, p. 113) have been the subject of congressional inquiry has resigned. Comsat is considered the frontrunner of those looking to purchase the satellites.

Guy W. Fiske, Deputy Secretary of Commerce, submitted his letter of resignation on May 10; the resignation became effective May 14. He had been scheduled to testify to two House Science and Technology subcommittee this month on the nature, extent, and propriety of his relationship with Comsat. As Eos went to press, it was unclear whether Fiske would still be asked to testify.

Comsat allegedly had been lobbying strongly for the Commerce official to back Comsat's purchase of the satellites. Fiske reportedly has been considering leaving government service for several months.

The House of Representatives voted on an amendment to the National Aeronautics and Space Administration authorization bill to block the satellite sale unless Congress gives its express approval. The Senate's version of the same bill is being discussed within the Commerce, Science, and Transportation Committee.

Rep. Harold L. Volkmer (D-Mo.), chairman of the House Space Science and Applications Subcommittee, one of the committees that was to have Fiske testify, was asked what implications the resignation might have on the proposed sale. Volkmer told Eos, "I don't think it will help any." —BTR

News (cont. on p. 378)



Fig. 1. Initial phase of plume development, detected by satellite NOAA-7 at 00:47 UT on February 18, 1983. Note three apparent sources for the plume.



News (cont. from p. 377)

## Stellar Cannibalism

Astronomers have obtained evidence that stars can literally swallow other stars, leading to the ejection of stellar material into space and the formation of extremely close pairs of stars, according to the National Science Foundation (NSF). The discovery supports theoretical predictions of the evolution of double stars.

While studying the central stars of planetary nebulae—disk-shaped gas clouds that vaguely resemble planets—Albert D. Grauer of the University of Arkansas at Little Rock and Howard E. Bond of Louisiana State University at Baton Rouge found that several of these central stars are actually very close stellar pairs. Previously, it had been thought that the central star in a planetary nebula was a single star that expelled a gas cloud as it neared the end of its life. Their latest discovery, the central star of planetary nebula Abell 41, consists of a pair of stars that orbit each other in 2 hours and 43 minutes. The researchers also have found three other central star pairs that have orbital periods of between 11 and 18 hours.

The discovery supports theoretical predictions of the evolution of double stars, the astronomers said. It is believed that when a star exhausts the hydrogen fuel in its interior, it expands to become a huge, cool, red giant. If a star that becomes a red giant happens to have a second star orbiting it—as at least half of all stars do—the companion star may suddenly find itself inside the outer layers of the red giant. Much as an earth satellite's orbit begins to decay once it enters the outer layers of the earth's atmosphere, the swallowed star would then begin a gradual, inward spiral inside the extended atmosphere of the red giant. As the captured star spirals in, it gradually speeds up the rotation of the outer layers of the red giant. This process continues until enough energy is transferred to the outer layers of the red giant to cause them to be expelled, leaving a close pair of orbiting stars surrounded by a nebula gas cloud.

The astronomers used telescopes at Kitt Peak National Observatory near Tucson, Ariz., at Cerro Tololo Inter-American Observatory in Chile, and at the Louisiana State University Observatory, in Baton Rouge. Kitt Peak and Cerro Tololo are national astronomy centers funded by NSF.

## Great Lakes Lab

The Great Lakes Environmental Research Laboratory (GLERL) would close under President Reagan's fiscal year 1984 budget proposal issued on January 31, 1983. GLERL, established in 1974, conducts experimental research in the field and laboratory on the physics, chemistry, and biology of the Great Lakes, their watersheds, sediments, and overlying atmosphere. Closing the lab would represent a cut of more than \$3.6 million from the ocean research program, which is part of the National Oceanic and Atmospheric Administration's (NOAA) ocean and coastal programs activity. Also, it would mean dismissing a staff of 90, according to Eugene Aubert, director of GLERL.

Congressional action on the proposed budget cuts for all of NOAA, including the status of the laboratory, is proceeding through hearings and budget markups. The House has completed its hearings and, as yet, has not scheduled a budget markup session for May 11. A Senate Appropriations subcommittee held its hearing on April 26; a budget markup has been tentatively scheduled for late May. GLERL had been proposed to be closed in the fiscal 1983 NOAA budget (Eos, February 23, 1982, p. 169), but was reinstated by Congress.

Support for continued operation of the laboratory was expressed in a letter sent by the entire Michigan congressional delegation on March 21, 1983, to the House appropriations subcommittee conducting hearings on the budget proposal to close GLERL.

Of the 15 NOAA Environmental Research Laboratories (ERL), GLERL is one of three "wet" laboratories. Present investigations include a study of the lake-scale structure of waves and their propagation characteristics through the use of 15 current meter moorings deployed in Lake Michigan. Also, the basin runoff behavior of the large watershed of Lake Ontario is under study using an interdependent tank-cascade model; this will develop better forecasting abilities once meteorological information has been supplied. In addition, a program is continuing which investigates the cycling, transport, and fate of toxic organic compounds. Involved in the research are 48 scientists, 30 graduate students, and 12 part-time employees who constitute a support staff.

If GLERL is closed, the fate of this research in progress is unclear. During the April 26 Senate Appropriations subcommittee hearing (Eos, May 10, 1983, p. 372), Sen.

## The IMS Source Book

Guide to the International Magnetospheric Study Data Analysis  
G.T. Russell and D.J. Southwood, editors

The International Magnetospheric Study, or IMS, was a coordinated effort to advance the knowledge of the dynamics of the magnetosphere, in particular to study the response of the near-earth environment to varying conditions in interplanetary space.

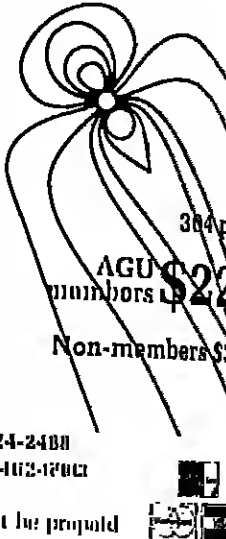
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Lowell P. Weicker, Jr. (R-Gonn.), Assistant NOAA Administrator John V. Byrne about the impact closing the laboratory would have on environmental research in the Great Lakes.

"We anticipate a certain amount of research to continue" at regional universities and through other federal agencies, Byrne told Weicker. Although changes will result from closing the laboratory, "much of the research will continue," Byrne added.

Before the hearing, another NOAA staffer indicated that some projects would simply be terminated if the laboratory were to close, while others may be transferred to the Pacific Marine Environmental Laboratory in Seattle or to the Atlantic Oceanic and Meteorological Laboratory in Miami, the other two wet laboratories in the NOAA system. GLERL Director Aubert argued that the transfer of research projects is highly unlikely. He stressed that the other laboratories are geared mostly toward heavy metal research; GLERL investigates the biology of lake systems and operates a lake hydrology research group that is unique among the ERLs. Furthermore, NOAA would not be able to absorb or relocate the personnel involved, Aubert said. A source at NOAA stated that individuals would have to choose to resign, to apply for positions in other parts of NOAA, or to retire, depending on their age and years with the government. The bulk of the research could be conducted by the states in the region, but this could cause a great financial and administrative burden on the states, according to the NOAA staffer.

Among the agencies that use the laboratory's data are the National Weather Service, the Office of Marine Pollution Assessment, the National Ocean Service of the Ocean Assessment Division, the Environmental Protection Agency, and the Army Corps of Engineers. In addition, many states, private institutions, and the general public have access to the data.


Completed data and other project information supplied by GLERL are archived in the National Geophysical Data Center or the National Oceanographic Data Center (Eos, April 15, 1982, p. 218). GLERL maintains a working data base that includes information that is originated or gathered from other agencies. This working data base, which is used only by GLERL scientists, would be lost if the laboratory closes.—MEG

## Shell Funds Chair

The Shell Companies Foundation, Inc. of Houston, Tex., has given \$750,000 to the University of Texas at Austin to establish the Shell Distinguished Chair in Geophysics. The 5-year, \$150,000-per-year grant will support the studies of John G. Sclater, Schlumberger professor at the Maveson Institute of Technology, who has accepted a position that begins July 1 in the geological sciences department and in the Institute for Geophysics at UT Austin.

Sclater's research into the formation of ocean basins has applications for understanding the way petroleum deposits mature. He has studied the reconstruction of movements of the continents and the subsidence of ocean basins. He is considered an expert in the interpretation of geothermal and seismic data.

The grant is part of the Shell Distinguished Chair program, established in 1980. The chairs are not endowed, but are 5-year chairs in the sciences, engineering, business, and public affairs. Their holders are to be promising young scientists with an established reputation as outstanding performers and with potential for continuing brilliant careers, said Davis Pittman, senior vice president of the Shell Companies Foundation. Previously, Princeton University also received a grant from Shell to support a chair in the geosciences.



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## Books

## Física de la Tierra

Agustín Udías Valladares, Alhambra, Madrid, Spain (in Spanish), v + 73 pp., 1982.

Reviewed by Cinna Lamnitz

This brief introductory textbook fills a niche need. There have been no accessible references in Spanish in general geophysics. The level of the book requires only a knowledge of high school physics, according to the preface; however, this is not so much a high school text as a reference guide for the general reader.

The book contains four chapters: (1) Gravity and the Shape of the Earth, (2) Earthquakes and the Interior of the Earth, (3) The Magnetic field, and (4) Origins and Evolution of the Earth. The latter chapter contains most of the relevant information on plate tectonics and dynamics of the lithosphere. The sequence of chapters is somewhat awkward, since the idea of lithosphere plates is already introduced in Chapter 2. In fact, the discussion of plate tectonics contains several inconsistencies: in Figure 4-4, for example, volcanoes are shown as plumes rising from the Benioff zone and erupting offshore, on the continental slope. The text compounds the confusion: "Because of the dip angle of the sinking plate, these volcanoes are found behind the coast line. Continental rocks in the collision zone are pushed up to form large mountain ranges in some places, such as the Andes."

The first three chapters are treated in a more traditional fashion and are generally more reliable. Again, they are marred by a few confusing or inaccurate figures and statements.

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**Cover.** Infrared image of plume over Bennett Island taken by weather satellite NOAA-6, at 08:18 UT on February 18, 1983. The plume is fully developed and originates over the NE corner of Bennett Island, one of the DeLong Islands on the Siberian continental shelf. The DeLong Islands are sketched in by hand. Dark areas in this infrared picture mean warmer temperatures (for instance, the open water leads in the ice). Length of plume: 250 km; temperature at the top of the plume: -40°C. For the meteorological conditions of that day, this temperature existed at 7 and 18 km altitude. The most probable altitude of the plume is 7 km. See news item, this issue. (Photo courtesy of J. Kienle, J. G. Roederer, and G. E. Shaw, Geophysical Institute, University of Alaska, Fairbanks.)

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Deep Drilling Results in the Atlantic Ocean: Continental Margins and Paleoenvironments (1979), edited by M. Talani, W. Hay, and W.B. Ryan, 439 p.p., ISBN: 0-87590-402-5 List price \$23.00.

Deep Drilling Results in the Atlantic Ocean: Ocean Crust (1979), edited by M. Talani, C.G. Harrison, and D.E. Hayes, 446 p.p., ISBN: 0-87590-401-7 List price \$23.00.

Island Arcs, Deep Sea Trenches, and Back-Arc Basins (1979), edited by M. Talani and W.C. Pitman, 480 p.p., ISBN: 0-87590-400-9 List price \$23.00.

These minor slips may be attributed to the author's effort to present a large and complex subject on an elementary level and in a compressed yet easily comprehensible format. This necessarily leaves some ends in the text and makes some statements more definitive than they should be. I suppose that one might judge the results in terms of whether the intention of the author, as stated in the preface, has been achieved: "In this text I aim to present in an accessible form the more elementary foundations of the science called geophysics, or physics of the earth. Professor Udías amply fulfills these expectations. He has provided a lively account—spiced with numerous historical references—of an evolving science. Whenever possible, examples are drawn from Spanish earthquakes; values of the gravity and magnetic fields are given for Spain; and so on. The text contains 10 numerical equations, which seem either too few or too many."

I would predict that many young people in Spain and Latin America will be introduced to geophysics via this attractive, low-priced book.

Cinna Lamnitz is with the Instituto de Investigaciones en Matemáticas Aplicadas y en Sistemas, Universidad Nacional Autónoma de México, 01000 México, D. F., México.

## New Publications

Items listed in New Publications can be ordered directly from the publisher; they are not available through AGU.

*Agroclimatic Information for Development: Reviewing the Green Revolution*, D. F. Casack (Ed.), Westview Press, Boulder, Colo. xiv + 397 pp., \$20.

*Atlas of Tectonic Maps of Australian Earthquakes*, I. B. Everingham, A. J. McEwen, and O. Denham, *Bulletin 214*, Bureau of Mineral Resources, Geology, and Geophysics, Australian Government Publishing Service, Canberra, unpaged, 1982.

*Biological Methods of Prospecting for Minerals*, R. R. Brooks, John Wiley, New York, xiv + 322 pp., 1983, \$42.95.

*Developments in Geophysical Exploration Methods*, vol. 4, A. A. Fitch (Ed.), Applied Science, New York, x + 200 pp., 1983, \$37.

*The Earth Through Time*, 2nd ed., H. L. Levin, Saunders College Publishing, New York, vii + 513 pp. + appendix, 1983.

*Fundamental Research on Estuaries: The Importance of an Interdisciplinary Approach*, Panel on Estuarine Research Perspectives, National Research Council, National Academy Press, Washington, D. C., xi + 79 pp., 1983.

## FUN RUN

**RUNNERS:** Enter the FUN RUN (unofficial activity during the AGU Spring Meeting)

**WHERE:** Fort McHenry

**WHEN:** 6:30 PM, Wednesday, June 1

**DETAILS:** Check the information board located on the meeting level, Baltimore, Convention Center. Organizers: Stephen R. McNitt and Michael Korig

## NASA Budget in Congress

The House of Representatives has authorized \$161.7 million more than President Ronald Reagan proposed for the fiscal 1984 National Aeronautics and Space Administration (NASA) budget. The House NASA authorization bill (H.R. 2065) passed by voice vote on April 26. Five days earlier, the Senate Commerce, Science, and Technology Committee marked up S. 1098, the Senate's NASA authorization bill, and recommended \$171.6 million more than the Reagan proposal. The Senate is expected to vote on the bill in mid May, after which time a conference committee will iron out the differences between the House and Senate versions.

President Reagan requested a total NASA budget of \$7.1065 billion: \$3.7085 billion for research and development, \$150.5 million for construction of facilities, and \$1.2475 billion for research and program management (Eos, February 15, 1983, p. 65).

The House authorized a total of \$7.2882 billion, which includes \$5.8886 billion for research and development, \$137.1 million for

construction at facilities, and \$1.2425 billion for research and program management.

The Senate committee recommended a total budget of \$7.2781 billion: \$5.8885 billion for research and development, \$142.1 million for construction at facilities, and \$1.2475 billion for research and program management. In the five R&D categories (see table), the largest recommended increases over the president's proposal were in technology utilization (150%) and space science and applications (approximately 8%).

Within space science and applications, the House authorized \$92 million more for physics and astronomy programs, with \$45 million of that increase targeted for the space telescope. In addition, all of the House's \$15 million increase for planetary exploration was targeted for research and analysis. The Senate committee recommended increases to physics and astronomy programs of \$50 million for the space telescope, \$5 million for research and analysis, and \$5 million for research and analysis. The committee recommended cancelling \$16 million proposed by President Reagan for the solar optical telescope.—BTR

Status of NASA FY 1984 Research and Development Budget, in Millions of Dollars

Activity	Reagan Proposal	House Bill*	Senate Committee Markup 4/21†
Space transportation systems (capability development)	3498.0	3571.8	3358.0
Operations	1927.4	2001.2	2022.4
Space science and applications	1570.6	1370.8	1335.6
Physics and astronomy	1068.0	1152.0	1154.0
Planetary exploration	514.8	566.6	566.6
Life sciences	205.4	220.4	215.4
Space Applications	50.0	59.0	59.0
Technology utilization	289.0	306.0	321.0
Aeronautics and space technology	4.0	10.0	10.0
Aeronautics	438.3	454.6	486.3
Space Technology	300.3	311.8	328.3
Tracking and data acquisition	138.0	143.0	138.0
Total research and development	5708.5	5888.6	5886.5

\*The House of Representatives passed the NASA Authorization Bill, H.R. 2065, by voice on April 26.

†These figures are the results of the budget markup of the Senate version of the NASA Authorization Bill, S. 1098, by the Senate Committee on Commerce, Science, and Technology on April 21. The bill is expected to be voted on by the entire Senate by mid May.

Includes solid earth observations, environmental observations, materials processing in space, communications, and information systems.



# Classified

## RATES PER LINE

Positions Wanted: first insertion \$1.75, additional insertions \$1.50.  
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Student Opportunities: first insertion free, additional insertions \$1.50.

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For further information, call toll free 800-424-2488 or, in the Washington, D.C. area, 462-6903.

## POSITIONS WANTED

**Hydrology/Environmental Science.** Ph.D. research associate seeks research/teaching position. Research areas include soil water dynamics, watershed modeling, hillslope hydrology, contaminant transport. Interested in interdisciplinary and collaborative work. Please send resume and references to: Dr. J. R. Ehler, American Geophysical Union, 2000 Florida Avenue, N.W., Washington, D.C. 20009.

## POSITIONS AVAILABLE

**Sedimentology.** Lawrence Doherty Geological Observatory of Columbia University seeks a sedimentologist with a strong research interest in sedimentary and tectonic processes. The position is at a research level and involves field and laboratory work. The position is at a research level and involves field and laboratory work. The position is at a research level and involves field and laboratory work.

**Geology (with emphasis on petrology).** University of California, Riverside. Visiting Lecturer opening beginning September 1983. Although the initial appointment will be for one year, it is annual and renewable. The appointment could lead to a full-time position next year.

**Appointments would lead to a full-time position.** Graduate level and should be able to teach several of Petrology, Mineralogy, Geochemistry, Field Geology, Physical Geology, Ph.D. required. In addition to teaching, research and service are expected of faculty members at Columbia.

**Applicants should submit a current curriculum vitae with names and addresses of three people who have agreed to provide references.** Applications should be completed by July 30, 1983. However, late applications may be accepted until successful candidate is appointed.

**Send applications to:** Dr. Lewis H. Cohen, Department of Earth Sciences, University of California, Riverside, California 92521.

**The University of California is an equal opportunity/Affirmative Action Employer.**

**Bureau of Mineral Resources, Australia/Marine Geophysics.** The Australian Bureau of Mineral Resources, Geology and Geophysics (ABMR) is charged with developing an integrated, comprehensive, scientific understanding of the geology of the Australian continent and offshore areas as a basis for mineral exploration.

**The Division of Marine Geosciences and Petroleum Geology** undertakes a wide range of regional and offshore geological and geophysical investigations and is responsible for the analysis and integration of geoscientific data collected by private petroleum exploration companies offshore.

**Classification will be at Principal Research Scientist level.** Senior Principal Research Scientist level depending on the successful candidate's qualifications and experience.

**QUALIFICATIONS:** A Ph.D. (or equivalent) together with demonstrated research ability. \$43,380-\$44,010, Senior Principal Research Scientist (SPRS)—\$44,260-\$44,890.

**CONDITIONS:** Conditions of service include superannuation, long service leave, four weeks annual leave and removal expenses to Canberra. Permanent appointment is available to persons who are British subjects eligible for permanent residence in Australia. A term engagement would be considered for persons not meeting this criterion.

**Applications together with full personal and professional details and the names of at least three referees should be sent to:**

The Director  
Bureau of Mineral Resources  
P.O. Box 378  
CANBERRA CITY ACT 2601  
AUSTRALIA  
Applications close 5 June 1983.

**Research Associate.** The Stanford University School of Earth Sciences and the Center for Materials Research seek research-oriented scientists for an initial three-year appointment to start approximately October 1983 whose responsibilities will include:

- (1) Supervision and maintenance of a new XRF-XRD facility.
- (2) Supervision of a new ESCA spectrometer, and
- (3) Interaction with our microprobe technician in optimizing software for geological applications.

Duties will include training faculty and student users of the XRF, XRD, and ESCA, but not service work. Experience in operation of XRF, XRD, and/or electron microprobe required; we will train on the ESCA. A good working knowledge of DEC Series 11 computers (11/02, 11/23, 11/34) operating under the VMS-11M monitor and of FORTRAN level programming is essential. Although we envision that the duties associated with this new equipment will constitute a full-time job for a year or two, we prefer Ph.D. level applicants who desire eventually to develop their own research program in conjunction with Stanford faculty.

Send C.V. to Gail Mahood, Department of Geology, Stanford University, Stanford, CA 94305.

**Research Associate.** The Earth Resources Laboratory of the Department of Earth and Planetary Sciences is seeking a research staff member for digital full waveform acoustic log data analysis. The applicant should have a Ph.D. in geophysics or electrical engineering/computer science with at least three years industrial experience with well log analysis.

Duties will include the development of data analysis packages for full waveform acoustic log, initiating new data analysis techniques and directing the handling of digital data at the Earth Resources Laboratory. Individual will also be expected to supervise the program and data transfer between ERL and members of the full waveform acoustic logging consortium.

Please state minimum salary requirements. Resumes should be submitted to: Professor M.N. Toksoz, c/o Vera Sillard, MIT, Cambridge, MA 02139.

MIT is an equal opportunity/affirmative action employer.

**Research Associate/Petrology-Petrology.** To join a research effort aimed at understanding the condensation history of the solar system by mineralogical, chemical, and isotopic studies of tiny inclusions in primitive meteorites. Applicant need not have previous experience with meteorites but should have a superb petrographic skill in the use of the SEM and electron probe. Successful candidate will be dedicated, productive, an effective communicator both orally and in writing, and will have Ph.D. in hand. Vacancy expected in late summer or early autumn 1983.

Send resume and names of three references to: L. Grossman, Department of the Geological Sciences, University of Chicago, 5734 S. Ellis Avenue, Chicago, IL 60637.

**The University of Chicago is an equal opportunity/affirmative action employer.**

**University of Georgia/Faculty Positions.** The Department of Geology anticipates hiring as many as five people at the rank of Assistant Professor, Professor, or either a permanent (tenure track) or temporary basis.

Duties include teaching undergraduate and graduate courses and conducting research. Teaching/research specializations to be considered include: economic geology, geochemistry, mineralogy, paleontology, sedimentation, structural geology, geophysics, and marine geology.

Letter of application—including a statement of specific teaching and research interests, curriculum vitae, and names and addresses of three references—should be sent to: Head, Department of Geology, University of Georgia, Athens, GA 30602.

Deadline for receipt of applications is June 20, 1983. Should sufficient candidates not be found, another search may be opened.

**The University of Georgia is an equal opportunity/affirmative action employer.**

**Structural Geology/Petrology.** Lafayette College seeks a person to teach undergraduate physical and structural geology, igneous and metamorphic petrology, and additional courses, dependent on applicant's background. Ability to teach introductory geology is desirable but not mandatory. Teaching load averages ten to twelve contact hours and two or three (Ph.D. completed or in progress) Ph.D. pending.

Send application and resume, and arrange for three reference letters to Dr. Richard W. Park, Department of Geology, Lafayette College, Easton, PA 18042.

**Lafayette College is an equal opportunity employer.** M/F. Women and minorities are encouraged to apply.

**Research Associate Position.** The Department of Earth and Planetary Sciences is seeking an individual with a Ph.D. in geophysics to lead a group effort in network seismology and earthquake hazards evaluation.

The successful candidate should have a solid background in both theoretical and observational seismology, as well as a minimum of three years experience in digital seismic network operation. A working knowledge of field seismological techniques, probabilistic hazards estimation, and strong motivation to lead a group research effort. Please state minimum salary requirements.

Submit resumes to: M.N. Toksoz, c/o Vera Sillard, MIT, Cambridge, MA 02139.

MIT is an affirmative action/equal opportunity employer.

**Research Positions for Mathematical Physicists.** Applications are invited for several research positions in the Center for Studies of Nonlinear Dynamics, La Jolla Institute, beginning summer 1983. Current research involves work on nonlinear wave-wave interactions, acoustic, optical, and radio wave propagation in random media, and fluctuation phenomena in the statistical mechanics of physical and geophysical systems. Mathematicians and applied mathematicians who are interested in working on problems of the above type should send resumes and arrange for three references to be sent to: Dr. Stanley Hame, Director, CSND, La Jolla Institute, 8850 Villa La Jolla Drive, Suite 2150, La Jolla, California 92037.

**Research Scientist in Space Physics.** The Laboratory for Atmospheric and Space Physics at the University of Colorado announces openings for one or more research scientists.

The successful candidate(s) will join our experimental research programs in solar terrestrial physics and planetary magnetospheres. LASP has ongoing sounding rocket and satellite programs dedicated to the development of state-of-the-art instruments for space research.

An advanced degree is required; a background in solar, planetary or atmospheric sciences is desirable. The successful candidate(s) will be responsible for the development of state-of-the-art instruments for space research.

Applications, including a current professional resume and the names of three references should be sent by June 10, 1983, to: Dr. Charles A. Barth, Director, Laboratory for Atmospheric and Space Physics, Campus Box 392, University of Colorado, Boulder, CO 80502.

**THE UNIVERSITY OF COLORADO IS AN EQUAL OPPORTUNITY/AFFIRMATIVE ACTION EMPLOYER.**

**GeD Position/Texas A&M University.** The Department of Oceanography of Texas A&M University has an opening for a tenure track assistant professor in physical oceanography to be filled by September 1983.

Preference will be given to candidates with strong theoretical background in geophysical fluid dynamics. The successful applicant will be expected to teach undergraduate and graduate courses and to conduct a vigorous research program in his or her specialty. A Ph.D. is required for this position and one year's experience in a postdoctoral position is desired. Salary is negotiable depending upon experience and qualifications.

Applicant should submit a vita along with a letter describing his/her research and teaching goals and names of five persons for reference to Professor R.O. Reid, Head, Department of Oceanography, Texas A&M University, College Station, TX 77843. The closing date for applications is May 31, 1983. Texas A&M University is an affirmative action/equal opportunity employer.

**Postdoctoral Position in Physical Oceanography.** A postdoctoral appointment in physical oceanography will be available beginning September, 1983, in the College of Marine Studies, University of Delaware, Newark, DE. The initial appointment will be for one year with a renewable extension for a second year. The salary will be \$24,000—\$28,000 per year, depending on experience. Funds for the position will be available largely from a grant by NSF for the study of the shelfbreak from the Middle Atlantic Bight.

The person obtaining the appointment would be responsible for a portion of the planning and execution of the field study, much of the subsequent data analysis and interpretation, and teaching of one graduate level course in physical oceanography each year. The successful applicant must have received the Ph.D. in physical oceanography or a closely related field in the last five years.

Preference will be given to applicants with direct experience in the shelfbreak study. To apply send a curriculum vitae and the names of three references to Professor R.W. Fairbridge, College of Marine Studies, University of Delaware, Newark, DE 19711. Telephone: 302-739-2100.

**The University of Delaware is an equal opportunity/affirmative action employer.**

**Chairman—Department of Geological Sciences, Wright State University.** The Department of Geological Sciences, Wright State University, is seeking an individual to be appointed as Chairman. The successful candidate will be responsible for the department's academic and administrative affairs. The position is a full-time position with a salary of \$24,000—\$28,000 per year, depending on experience. Funds for the position will be available largely from a grant by NSF for the study of the shelfbreak from the Middle Atlantic Bight.

The person obtaining the appointment would be responsible for a portion of the planning and execution of the field study, much of the subsequent data analysis and interpretation, and teaching of one graduate level course in physical oceanography each year. The successful applicant must have received the Ph.D. in physical oceanography or a closely related field in the last five years.

Preference will be given to applicants with direct experience in the shelfbreak study. To apply send a curriculum vitae and the names of three references to Professor R.W. Fairbridge, College of Marine Studies, University of Delaware, Newark, DE 19711. Telephone: 302-739-2100.

**The University of Delaware is an equal opportunity/affirmative action employer.**

**University of Colorado, Boulder, Geochronologist Position.** Geochronologist with active research program in stable isotopes, radiocarbon isotopes, and/or trace elements is being sought for a joint appointment in the Department of Geological Sciences and the Cooperative Institute for Research in Environmental Sciences (CIRES) of the University of Colorado.

The one-half time position within the Department of Geological Sciences is to be a tenure track assistant or associate professor level with a starting salary of \$12,000—\$15,000 for the academic year.

Teaching load will be half that of full-time faculty. The position within CIRES will be as a Fellow which incumbent must generate his/her CIRES salary further by generating other months of summer salary from contracts and grants, and consulting.

Applicants with experience, publications, and/or preferred starting date would be given preference. Closing date for applications is October 1, 1983.

Applicants should include statement of research interests, experience, a full vita, and four letters of reference.

Apply to: Professor Charles Stern, Chairman, Geological Sciences Search Committee, Department of Geological Sciences, Campus Box 250, University of Colorado, Boulder, CO 80502.

**The University of Colorado is an equal opportunity/affirmative action employer.**

**Faculty Position in Sedimentary Geology at the University of South Carolina.** Applications are invited for a full-time faculty position in the Department of Geology and Earth Sciences, University of South Carolina, Columbia, SC 29208.

The successful candidate is expected to develop a strong research program with external funding, supervise graduate students, and teach in the geology department. The position is a full-time position with a salary of \$24,000—\$28,000 per year, depending on experience. Funds for the position will be available largely from a grant by NSF for the study of the shelfbreak from the Middle Atlantic Bight.

The person obtaining the appointment would be responsible for a portion of the planning and execution of the field study, much of the subsequent data analysis and interpretation, and teaching of one graduate level course in physical oceanography each year. The successful applicant must have received the Ph.D. in physical oceanography or a closely related field in the last five years.

Preference will be given to applicants with direct experience in the shelfbreak study. To apply send a curriculum vitae and the names of three references to Professor R.W. Fairbridge, College of Marine Studies, University of Delaware, Newark, DE 19711. Telephone: 302-739-2100.

**The University of Delaware is an equal opportunity/affirmative action employer.**

**Technical Assistant/Earth Resources Laboratory.** The Earth Resources Laboratory in the Department of Earth and Planetary Sciences is seeking an individual with a Ph.D. in geophysics to lead a group effort in network seismology and earthquake hazards evaluation.

The successful candidate should have a solid background in both theoretical and observational seismology, as well as a minimum of three years experience in digital seismic network operation. A working knowledge of field seismological techniques, probabilistic hazards estimation, and strong motivation to lead a group research effort. Please state minimum salary requirements.

Submit resumes to: M.N. Toksoz, c/o Vera Sillard, MIT, Cambridge, MA 02139.

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# AGU

## Membership Applications Received

Applications for membership have been received from the following individuals. The letter after the name denotes the proposed primary section affiliation; the letter A denotes the Atmospheric Sciences section, which was formerly the Meteorology section.

## Regular Member

Johnson B. O. Adewumi (H), Raymond Assef (O), Davey Lee Banning (V), Axel Bjorntun (T), J. K. Boling (H), Murray E. Brice (S), Timothy Chi Chiu (A), Steven M. Day (S), Rui Feng (S), Eric C. Itawete (O), J. C. Lau (V), Douglas D. Lindsey (T), Richard C. Lorton (V), Michael O. McCarthy (V), James Blyth Merriam (G), Carolyn J. Merry (H), Jun-ichi Nishida, Mmty B. Peffley (O), David B. Prior (O), John D. Randall (H).

James G. Sanders (O), Richard A. Schumann (S), N. J. Silberling (T), Frederick W. Tague (V), Takashi Tanaka (SA), George Tarkenton (H), Yui-Soung Tsao (H), Michael L. Vau Voert (O), David E. Venne (A), Terry J. Wilson (T).

Claire B. Davidson (H), Peter Done (G), Karen L. Johnstone (S), Duncan T. Mackenzie (O), Shelley H. Rogers.

# Meetings

## Announcements

## Call for Papers: 30th Pacific NW Meeting

The 30th Pacific Northwest Regional American Geophysical Union meeting will be held on the campus of Western Washington University, Bellingham, Wash., on September 30 and October 1, 1983. In addition to a general session, preliminary plans include special symposia on some or all of the following:

evolution of oceanic plates in the eastern Pacific; volcanism and seismotectonics of the Cascade Range; evolution and character of the crystalline North Cascade Range of Washington and British Columbia; and Tertiary tectonics of the western Washington and Oregon Coast Range province, with special attention to the origin of sedimentary basins.

Deadline for abstracts is August 1, 1983. To submit a paper, follow the standard AGU format published in the April 5, 1983, issue of EOS. Please send the original and two copies to:

PNAGU  
University Conference Center  
Western Washington University  
Old Main 400  
Bellingham, WA 98225  
Telephone: 206-876-3323

An extraordinarily inexpensive board-and-room package is available through the University. The campus of Western Washington University is one of the most scenic in the world, and early Fall is an excellent time for the visit. To take advantage of the unique geology for September 29, two field trips are planned for September 29. One will visit the Fidalgo ophiolite near Anacortes, Wash., and the other will cross the complex, crystalline alpine North Cascades via the North Cascades highway. The field trips will be led by E. H. Brown and R. S. Babcock, respectively. The cost of the field trips is minimal and will include lunch and field guide. Information on field trips and the board-and-room package will be supplied to each registrant.

Registration for the PNAGU meeting is \$15 and the registration deadline is September 1, 1983. Please contact the University Conference Center to be placed on a special mailing list.

Convenors of the conference are Myrl E. Beck, Jr., and David C. Engenbreton; their address is c/o PNAGU, Department of Geology, Western Washington University, Bellingham, WA 98225, telephone 206-876-3695.

## Soil and Water Conservation

The University of Missouri-Columbia has issued a call for papers for the Symposium on the History of Soil and Water Conservation, to be held May 24-28, 1984, in Columbia, Mo.

Conservation of agricultural lands and water resources will be the theme of the meeting. Submitted papers should cover aspects of the history of conservation that include soil science and soil survey; flood control and erosion developments in water law; land use change and soil erosion; small woodlands and reforestation; and federal land utilization projects.

For additional information contact Giorgio Flocco, Chairman, IERS '84, Dipartimento di Fisica, Città Universitaria, 00186 Rome, Italy (Telex: INFNRO 619265).

## Student Member

Alan P. Agle (T), Fred M. Allen (V), Arthur Bach (H), Gary J. Barton (H), B. O. Bauer (H), David Bearden (A), Alex Blum (O), Blake Lee Boteler (S), Christopher Bue (H), Steven Carlsou (T), Michael A. Cella (H), Kenneth H. Coale (O), James L. Culler (O), Ronald I. Durr (V), Mavis Driscoll (T), Raymond J. Eckert (T), Ted L. Eggleston (V), Martin Q. Fleisher (O), Dennis Geist (V), John Bowen Gerlach (T), Malcolm O. Green (O), John Webber Haines (O), Dean Hirschel (SM), Bradley Hoffman (S), Jan W. Hopmans (H), William R. Howard (O), Hui-Jin Huang (A), Hong Jye Hwang (S), Peter Koenig (O), Paul A. LaViolette (SC), Noelle Lewis (O), Peter M. Lorber (T), Gary A. Martin (O), Julie J. Moses (SM), Paul C. Novelli (O), David O'Brien (T), J. K. Orzech (O), James C. Phelps, Federico Restrepo (H), David Reynolds (T), Jim F. Riker (SA), Joao W. C. Rosa (S), Leslie Rosenfeld (O).

Michael V. K. Seto (H), Diane V. Shaw (O), Mike Stanton (T), Peter J. Stein (O), Aregai Teale (H), Cheng-Han Tsai, Sugiarta Wirsantosa (T), Bruce D. Witten (T), Scott Alan Wood (V).

**Associate Member**  
Claire B. Davidson (H), Peter Done (G), Karen L. Johnstone (S), Duncan T. Mackenzie (O), Shelley H. Rogers.

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462-6903 in the Washington, D.C. area.

## Groundwater Symposium

Exploration, development, and management of groundwater resources in various terrains, and the interaction between groundwater and waste disposal sites are the emphasis of the International Groundwater Symposium on Groundwater Resources Utilization and Contaminant Hydrology to be held May 21-23, 1984, in Montreal, Canada.

Nuclear waste repositories and the hydrogeology of fractured bedrock terrains are among the topics scheduled for separate sessions. In addition, field trips will be offered prior to and after the symposium, which is cosponsored by the Canadian Chapter of the International Association of Hydrogeologists and the Canadian Water Well Association.

Interested persons should submit, before September 1, 1983, a 250-word abstract written in English or French to F. Baechler, Nolan Davis and Associates Ltd., 74 Townsend Street, Sydney, Nova Scotia, Canada B1P 5C8. Deadline for submission of completed papers, written in English or French, is January 31, 1984. Simultaneous translation facilities will be provided at the symposium.

For additional information contact A. Kout, chairman, International Groundwater Symposium, Montreal 84, Ministry of Environment, 785 Broughton Street, Victoria, British Columbia, Canada V8V 1X5.

**Calderas and Volcanic Rocks**  
The origin of calderas and their relation to pyroclastic volcanism were first brought into focus by the catastrophic eruption of Krakatau in 1883. One hundred years later, much work is concentrating on the history of caldera-forming volcanic sequences, caldera-collapse mechanisms, the internal structure of calderas, and petrologic evolution of calderas. Social implications of calderas involve volcanic hazards, mineral resources, and geothermal energy.

For additional information contact, after July 1, 1983, J. R. Moore, Marine Science 200 East 28th Street, Austin, TX 78705 (telephone: 512-471-4816).

**Radiation Symposium**  
The International Radiation Symposium '84 (IRS), sponsored by the Radiacion Commission of the International Association of Meteorology and Atmospheric Physics, will be held August 21-29, 1984, in Perugia, Italy. The meeting will focus on radiation and climate, new measuring techniques and interpretation of experimental results, and fundamental radiation concepts.

Topics to be covered at the meeting include radiation-climate feedback mechanisms in relation to the atmosphere, the hydrosphere, and cryosphere and the desert amplification and vegetation changes in semi-arid zones; recent developments in radiation measurement techniques; results of field experiments to measure cloud and aerosol optical parameters and related theory; theoretical interpretation of spectral measurements including remote sensing of temperature and gas concentrations; fundamental radiation problems in relation to radiation in planetary atmospheres, radiation, dynamics, and chemistry; and new ideas in radiation science including thermodynamics.

For additional information contact Giorgio Flocco, Chairman, IRS '84, Dipartimento di Fisica, Città Universitaria, 00186 Rome, Italy (Telex: INFNRO 619265).

## AGU Spring and Fall Meetings

Future Dates and Rates  
1983 Fall Meeting: December 5-10  
Abstract deadline - September 14

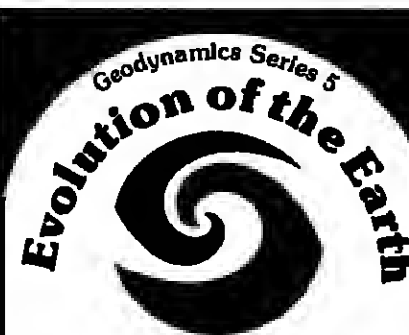
San Francisco  
Cathedral Hill, Holiday Inn Golden Gateway, Holiday Inn Civic Center, Grosvenor Inn, and San Francisco Hotels

Single \$47  
Double \$53

1984 Spring Meeting: May 14-18  
Abstract deadline - February 22

Cincinnati Convention Center  
Stouffer's Cincinnati Towers  
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Single \$56  
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## DELEGATES

18th General Assembly of IUGG

U.S. scientists planning to attend the 18th General Assembly of IUGG, Hamburg, West Germany, August 15-27, 1983, should notify A. F. Spilhaus, Jr., Secretary, U.S. National Committee, 2000 Florida Avenue, N.W., Washington, D.C. 20009, and indicate in which IUGG association they propose to participate so that they can be officially designated as delegates from the United States.

These and other topics of volcanic calderas will be the subject of a centennial symposium at the 1983 AGU Fall Meeting, followed by a special issue of the *Journal of Geophysical Research* on calderas. Possible contributions to either the Fall Meeting symposium or the JGR volume or both are solicited. Abstract deadline for the Fall Meeting will be in mid September; the deadline for initial submission of manuscripts for the special issue of JGR is August 15, 1983.

Manuscripts will be reviewed, following standard JGR procedures, and returned to authors for revision prior to the Fall Meeting in early December 1983. Final versions of all manuscripts for the calderas issue will



